

Amendments to the Claims

This listing of claims will replace all prior versions and listings of claims in the application.

Claim 1 (canceled).

Claim 2 (currently amended): The method as claimed in claim 17 ~~[[1]]~~, in which the spatialization of the virtual source is performed in an ambisonic context, further comprising:
~~a step for~~ calculating gains associated with ambisonic components in a spherical harmonics base.

Claim 3 (currently amended): The method as claimed in claim 17 ~~[[1]]~~, in which the synthetic sound is intended to be reproduced in a holophonic, or binaural, or transaural context, on a plurality of reproduction channels, ~~wherein, during said joint step,~~ the method further comprising:
calculating a delay between reproduction channels ~~is also determined~~, to define at the same time:

- a triggering instant of the sound characterizing the nature of the source, and
- the position of the source relative to a predetermined origin.

Claim 4 (previously presented): The method as claimed in claim 3, wherein the nature of the virtual source is parameterized at least by a temporal loudness variation, over a chosen duration and including a sound triggering instant.

Claim 5 (previously presented): The method as claimed in claim 4, wherein said variation comprises at least:

- an instrumental attack phase,
- a decay phase,
- a sustain phase, and
- a release phase.

Claim 6 (previously presented): The method as claimed in claim 3, wherein the spatialization of the virtual source is performed by a binaural synthesis based on a linear breakdown of transfer functions, these transfer functions being expressed by a linear combination of terms dependent on the frequency of the sound and weighted by terms dependent on the direction of the sound.

Claim 7 (previously presented): The method as claimed in claim 6, wherein the direction is defined by at least one bias angle and, preferably, by a bias angle and an elevation angle.

Claim 8 (previously presented): The method as claimed in claim 6, wherein the position of the virtual source is parameterized at least by:

- a number of filterings, dependent on the acoustic frequency,
- a number of weighting gains each associated with a filtering, and
- a delay for each "left" and "right" channel.

Claim 9 (currently amended): The method as claimed in claim 17 [[1]], wherein the nature of the virtual source is parameterized by at least one acoustic timbre, by associating the chosen relative loudnesses with harmonics of a frequency corresponding to a pitch of the sound.

Claims 10–16 (canceled).

Claim 17 (new): A method for operating a device for generating a synthesized and spatialized acoustic signal comprising:

receiving by a receiver of the device a command for synthesizing and spatializing a sound associated to a virtual source being disposed at a given position relative to a predetermined origin, the sound not being received by the device and being defined at least by a frequency of its fundamental mode, a duration, and an intensity;

calculating by a computer of the device a gain based on the intensity of the sound and the given position of the virtual source relative to the origin; and

outputting, by an output of the device, a synthetic sound signal representing the virtual acoustic source at the given position, said signal being defined at least by the gain calculated by the computer.

Claim 18 (new): The method as claimed in claim 17, in which a plurality of virtual sources to be synthesized and spatialized are provided, wherein each source is assigned to a respective position.

Claim 19 (new): A synthesis engine for synthesizing and spatializing an acoustic signal, comprising:

- a receiver for receiving a command for synthesizing and spatializing a sound associated to a virtual source being disposed at a given position relative to a predetermined origin, the sound not being received by the device and being defined at least by a frequency of its fundamental mode, a duration, and an intensity;
- a computer for calculating a gain based on the intensity of the sound and the given position of the virtual source relative to the origin; and
- an output for outputting a synthetic sound signal representing the virtual acoustic source at the given position, said signal being defined at least by the gain calculated by the computer.

Claim 20 (new): A synthesis engine according to claim 19, further comprising:

- a man-machine interface implemented in a music editing context to place the virtual source in a chosen position relative to a predetermined origin, to define the command for synthesizing and spatializing.

Claim 21 (new): A device for generating a synthesized and spatialized acoustic signal, comprising a processor, wherein the device also includes a working memory for storing

processor readable instructions for implementing an acoustic synthesis and spatialization method for operating the device, said method comprising:

receiving a command for synthesizing and spatializing a sound associated to a virtual source being disposed at a given position relative to a predetermined origin, the sound not being received by the device and being defined at least by a frequency of its fundamental mode, a duration, and an intensity;

calculating a gain based on the intensity of the sound and the given position of the virtual source relative to the origin; and

outputting a synthetic sound signal representing the virtual acoustic source at the given position, said signal being defined at least by the calculated gain.

Claim 22 (new): A computer program product, stored in a computer usable memory of a central processing unit or a terminal, or on a computer usable removable medium specifically for cooperating with a drive of said central processing unit, comprising instructions for implementing a method for operating a device for generating a synthesized and spatialized acoustic signal, said method comprising:

receiving by reception means of the device a command for synthesizing and spatializing a sound associated to a virtual source being disposed at a given position relative to a predetermined origin, the sound not being received by the device and being defined at least by a frequency of its fundamental mode, a duration, and an intensity;

calculating a gain based on the intensity of the sound and the given position of the virtual source relative to the origin; and

outputting a synthetic sound signal representing the virtual acoustic source at the given position, said signal being defined at least by the gain calculated by the computing means.

Claim 23 (new): A communication terminal, including a device for generating synthetic sounds comprising a processor and a working memory for storing processor readable instructions for implementing a method for operating a device for generating a synthesized and spatialized acoustic signal, said method comprising:

- receiving a command for synthesizing and spatializing a sound associated to a virtual source being disposed at a given position relative to a predetermined origin, the sound not being received by the device and being defined at least by a frequency of its fundamental mode, a duration, and an intensity;
- calculating a gain based on the intensity of the sound and the given position of the virtual source relative to the origin; and
- outputting a synthetic sound signal representing the virtual acoustic source at the given position, said signal being defined at least by the gain.